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Publication number: **0 453 598 A1**

(12)

## EUROPEAN PATENT APPLICATION

(21) Application number: **90107848.5**

(81) Int. Cl.<sup>5</sup>: **D06N 5/00, D06N 7/00**

(22) Date of filing: **25.04.90**

(43) Date of publication of application:  
**30.10.91 Bulletin 91/44**

(84) Designated Contracting States:  
**DE FR GB IT NL**

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(54) **Waterproof structure.**

(57) Waterproof structure is comprised of waterproof coating layer and reinforcing material layer consisting of an elastic long fiber nonwoven fabric. The reinforcing material layer is stretched and shrunk together with the waterproof coating layers accompanying the transition of the substrate to be waterproofed.

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## BACKGROUND OF THE INVENTION

### Field of the Invention

This invention relates to a waterproof construction, which is produced a waterproof function by providing a waterproof coating layer on a surface of a substrate such as roof slab, outer wall concrete and the like.

### Description of the Prior Art

In the past, in order to prevent a rupture caused with a cracking of substrate, a transition of joint portion and the like, the waterproof structure has been constructed by providing a reinforcing material such as glass cloth and the like between waterproof coating layers consisting of a coating material, which are used as a roof waterproof applications, said coating material being selected from the group of, for example, urethane rubber, acrylic rubber, chloroprene rubber and the like (see, JIS A 6021).

However, in the prior waterproof structure, the coating material, which is formed the waterproof coating layer has more than 50% of the extension at  $-20^{\circ}\text{C}$  and is stretched and shrunk accompanying the cracking of the substrate, but the stretchability of the reinforcing material such as the glass cloth and the like is either inferior than that of the coating film material or not extended entirely to break immediately accompanying the cracking of the substrate. Also, a stress, which is caused a force such that a coating laminated material having the stretchability is ruptured readily acts in the glass cloth reinforcing material layer as mentioned above, so that the stretchability defined in JIS A 6021 is very decreased to make weak waterproof layer having zero-span-tension.

### Summary of the Invention

The invention was accomplished on the basis of a recognition that the prior reinforcing material which is not extended as mentioned above is very decreased in the life of the waterproof construction.

According to the invention, a waterproof structure comprises providing a reinforcing material layer consisting of an elastic long fiber nonwoven fabric between waterproof coating layers consisting of a coating film material having excellent water- and weather-resistances in a sandwich construction, said elastic long fiber nonwoven textil having less than  $-20^{\circ}\text{C}$  of glass transition point, more than 50% of extension at rupture at  $60^{\circ}\text{C}$  and more than 100% of extension at rupture at normal temperature and said coating film material having less than  $-20^{\circ}\text{C}$  of glass transition point, more than

50% of extension at rupture at  $-20^{\circ}\text{C}$  and more than 50% of extension at rupture at  $60^{\circ}\text{C}$ .

In the waterproof structure according to the invention, the reinforcing material layer is stretched and shrunk together with the waterproof coating layer accompanying the transition of the substrate to be waterproofed.

When the glass transition point of the waterproof coating layer and the reinforcing material layer exceed  $-20^{\circ}\text{C}$ , the use of the waterproof construction is difficult in very cold district. When the extensions at rupture at  $-20^{\circ}\text{C}$  and  $60^{\circ}\text{C}$  of the waterproof coating layer and the reinforcing material layer are less than 50%, the resistance to cracking of the waterproof construction is decreased under the natural environment.

### Description of the Drawings and the Preferred Embodiments

The invention will now be described in greater detail with reference to an example and the accompanying drawing, in which:

Fig. 1 is a sectional view of an embodiment of the waterproof structure according to the invention, and

Fig. 2 is a perspective view showing an embodiment for forming the waterproof structure shown in Fig. 1.

As shown in Fig. 1, two waterproof coating layers 1a having excellent water- and weather-resistances and consisting of a coating film material having less than  $-20^{\circ}\text{C}$  of the glass transition point (second-order transition point), more than 50% of extension at rupture at  $-20^{\circ}\text{C}$  and more than 50% of extension at rupture at  $60^{\circ}\text{C}$  are applied to a substrate 2 such as roof slab, outer wall concrete, floor slab and the like. A reinforcing material layer 1b consisting of an elastic long fiber nonwoven fabric having less than  $-20^{\circ}\text{C}$  of glass transition point, more than 50% of extension at rupture at  $-20^{\circ}\text{C}$  and more than 100% of extension at rupture at  $60^{\circ}\text{C}$  ("ESPANSIONE" R manufactured by the applicants Kabushikikaisha Toshonishiwaki and Kabushikikaisha Innohgamic Chemical; comprises a spanbond of thermoplastic polyurethane elastomer, and have a structure which was laminated fine continuous filaments of 100% polyurethane elastomer fiber at random) is then sandwiched between the waterproof coating layers 1a as mentioned above.

The coating film material used in the formation of the waterproof coating layer 1a includes, for example, urethane rubber, acrylic rubber, chloroprene rubber, acrylic resin, rubber asphalt, butyl rubber, elastic polyester, epoxy resin and other waterproof coating film materials.

The elastic long fiber nonwoven fabric, which is

produced the reinforcing material layer 1b can be used, for example a nonwoven fabric having laminated structure formed by depositing fine continuous filament of 100% polyurethane elastic fiber in random (tensile strength 0.09 ~ 1.65 kg/cm).

The waterproof structure according to the invention having the construction as mentioned above is formed as follows: As shown in Fig. 2, an under coating film material 1a', which is formed the waterproof coating layer 1a is firstly applied on the substrate 2. Said substrate is subjected to drying and cleaning treatments prior to the coating. The elastic long fiber nonwoven fabric 2', which is formed the reinforcing material layer 2 is then applied on the under coating film material 1a' and further applied an upper coating film material 1a'' on said nonwoven fabric 2'.

A thickness of the waterproof structure 1 is 0.5 ~ about several mm, and the difference in the thickness can be changed suitably with a coating build-up (or coating repeat) of the coating film materials 1a' and 1a'' and also a thickness of the elastic long fiber nonwoven fabric can be changed suitably.

The waterproof structure according to the invention can be very improved the resistance to cracking, particularly the zero-span-tension without producing the rupture of the reinforcing material layer compared with the prior reinforcing material, because the reinforcing material layer used in the invention is stretched and shrinked together with the waterproof coating layers accompanying the transition of the substrate to be waterproofed.

#### Claims

1. A waterproof structure comprises providing a reinforcing material layer consisting of an elastic long fiber non-woven fabric between waterproof coating layers consisting of a coating film material having excellent water- and weather-resistances in a sandwich construction, said elastic long fiber nonwoven fabric having less than -20°C of glass transition point, more than 50% of extension at rupture at 60°C and more than 100% of extension at rupture at normal temperature and said coating film material having less than -20°C of glass transition point, more than 50% of extension at rupture at -20°C and more than 50% of extension at rupture at 60°C.
2. A waterproof structure according to claim 1, wherein the fabric comprises a spanbond of thermoplastic polyurethane elastomer and having a laminated structure formed by a randomly deposited fine continuous filament of 100% polyurethane elastic fibre.

3. A waterproof structure according to claims 1 or 2, wherein the coating film material is selected from the group of urethane rubber, acrylic rubber, chloroprene rubber, acrylic resin, rubber asphalt, butyl rubber, elastic polyester, epoxy resin and other waterproof coating film materials.

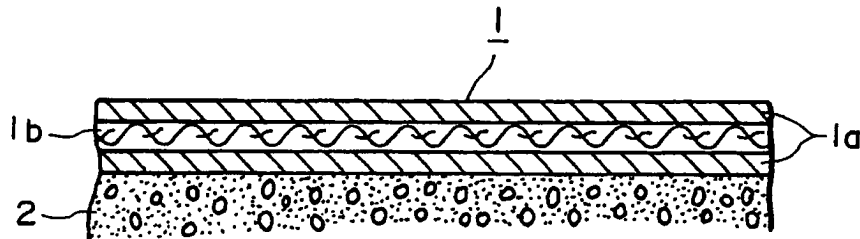


FIG. 1

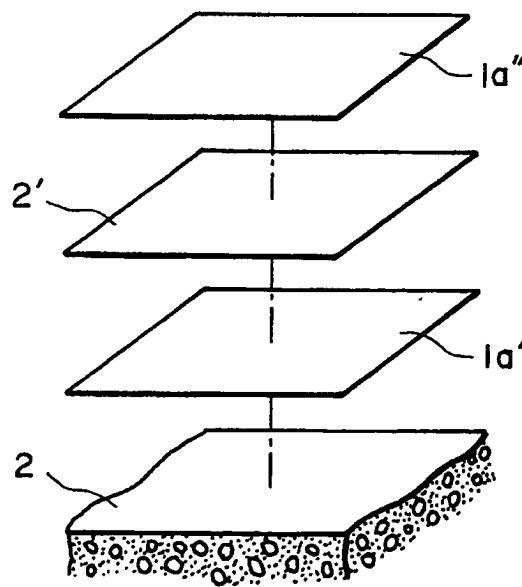


FIG. 2



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## EUROPEAN SEARCH REPORT

Application Number

EP 90 10 7848

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-A-2 544 368 (INMONT CORP.) "claim 1" examples 1, 9" - - -	1	D 06 N 5/00 D 06 N 7/00
A	FR-A-2 527 660 (C. CARON) "claims 1, 4" - - - - -	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D 06 N D 04 H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 14 December 90	Examiner PFANNENSTEIN H.F.
<div>CATEGORY OF CITED DOCUMENTS</div> <div>X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention</div> <div>E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &amp;: member of the same patent family, corresponding document</div>			